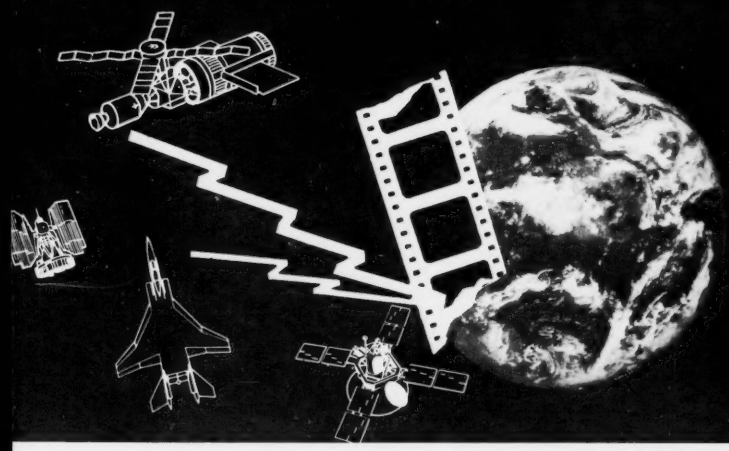
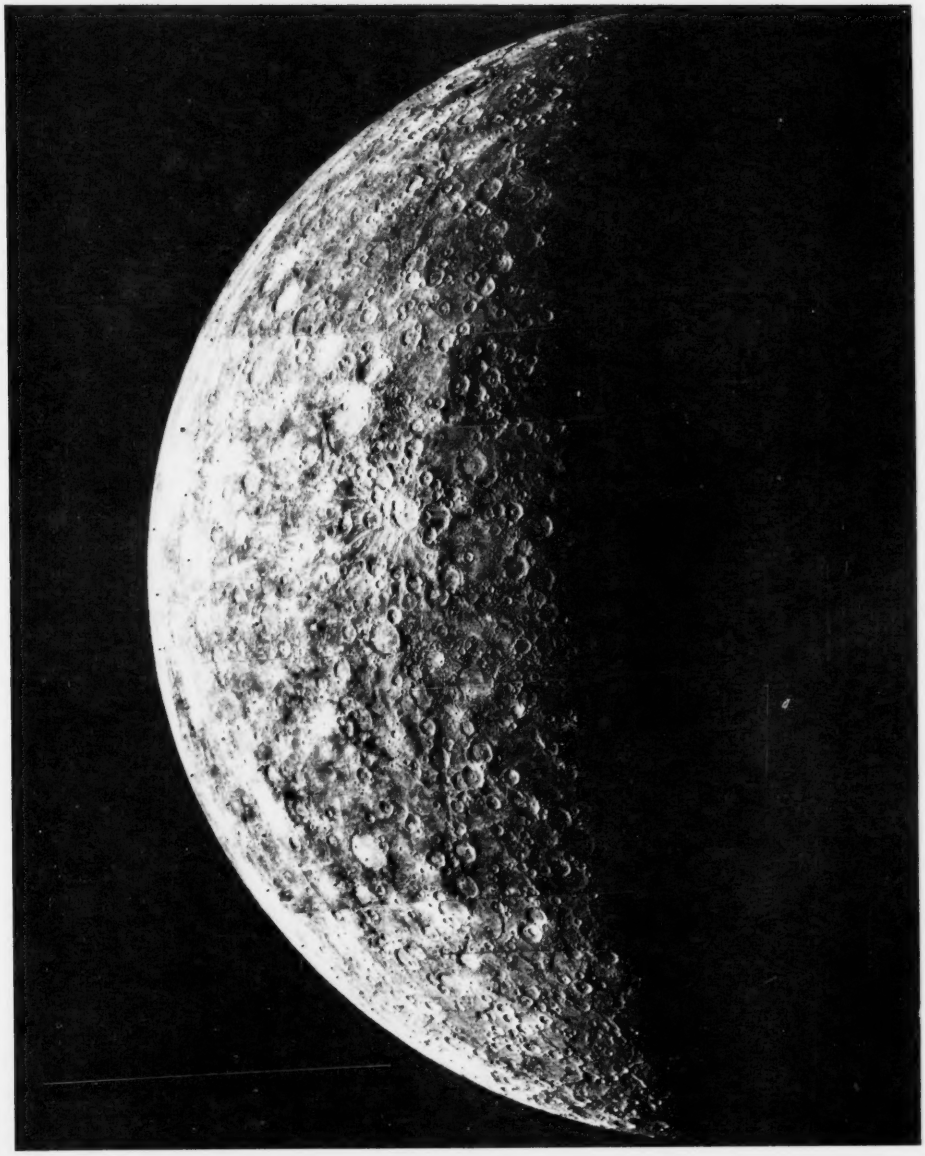


NASA ACTIVITIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

April 15, 1974 Vol. 5, No. 4



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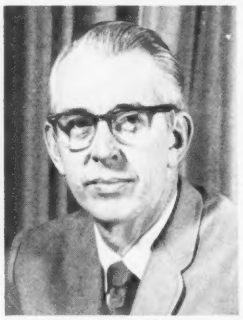
LETTER FROM WASHINGTON

April 5, 1974

Dear Colleagues:

Because I wrote last month on NASA's current efforts and long-range potential to help overcome energy shortages, this is the first opportunity I have had in a Letter from Washington to comment on the successful completion of the Skylab program.

During the last year I have written and spoken many times about Skylab achievements. I have called it Man's first home in space and the most productive satellite of our era. It has without doubt opened a new part of the solar system for occupation and use by mankind. It has been a magnificent scientific and technological effort carried out in the best traditions of the old NACA and the new NASA. The Skylab team did what was expected of it, and much more, and it was all done in a highly professional manner. So perhaps the best way to extend my congratulations and thanks to all who participated in and supported Skylab is simply to say, "Well done!"



President Nixon made a number of good points in his talk to employees of the Johnson Space Center and their families last month, after decorating the Skylab 4 crew. He paid tribute to all the people across the country, in government, in-

COVER

Picture of Mercury, taken on March 29 by Mariner 10, showing craters as small as 160 kilometers (100 miles) across.

dustry, and the universities, who worked on the Skylab program, and other space programs. Most of them are not going to get medals, or be recognized like the astronauts, he said, "but every astronaut I have ever talked to says it is because of those men and women on the ground that we were able to do what we did in space and I applaud those on the ground, all of you. We thank you for your service to make what they did possible."

The President explained the importance to world peace and progress of cooperative undertakings like the Apollo-Soyuz Test Project. He put it this way: "We are negotiating with the Soviets, with the People's Republic of China, two systems with which we have broad ideological differences, but wherever we can work together, whether it be exploration of space, or in cleaning up the environment, or in finding the answer to those diseases that plague mankind, let us have the statesmanship to see that we work together rather than separately, because all of mankind will benefit, not just America, and that is what we want."

I was also impressed by the fact that the President praised not only the technological and scientific achievements in our space effort, but also what it does for the spirit of the American people to be moving forward in this area. I know that many of us in NASA share this view.

You have contributed to a great technological breakthrough, the President told his NASA audience, but when history is written in perspective 20 years from now it will be clear that "you have contributed to what is far more important: the spirit of a great country, which means always look out toward the unknown, go there, take any risk, make any sacrifice, and never be discouraged because sometimes you may fail."

Needless to say, we appreciate the mandate we have from the President, the Congress, and the American people to continue our voyages into the unknown and explore throughout the Solar System. And I would like to say at this point, as the results are coming in from Mariner 10's flight close to Mercury, that the people in our planetary programs have been doing a near-perfect job of carrying out this mandate.

Pioneer 11 has now completed the second crossing of the rock-strewn Asteroid Belt, and the decision has been made to use Jupiter's gravity to explore Saturn in September, 1979. Our ability to assign Pioneer 11 to this second "bonus" mission into the unknown after exploring Jupiter in December of this year is the direct result of the valuable information about Jupiter returned by Pioneer 10 and the precise ability of our planetary "sailors" to control and operate these remarkable little Pioneer spacecraft over distances of hundreds of millions of miles.

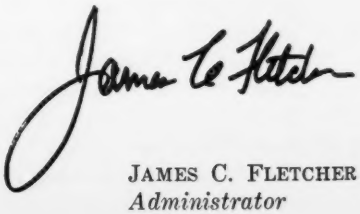
Mariner 10 has also demonstrated the precision of our space navigation. Two course changes were made on the way to Venus, and the results were so accurate that Mariner 10 passed within about seven miles of the aiming point at Venus. Another course change after passing Venus sent Mariner 10 within 416 miles of the surface of Mercury, which was much closer than we had originally hoped to come, and the experimenters were well pleased with this.

Precision of this sort is only the basic step in a successful planetary mission, but it does give the layman a good idea of what our present-day spacecraft and control teams can do. So do the excellent television pictures of the Venus cloud systems and the terrain of Mercury sent back by Mariner 10.

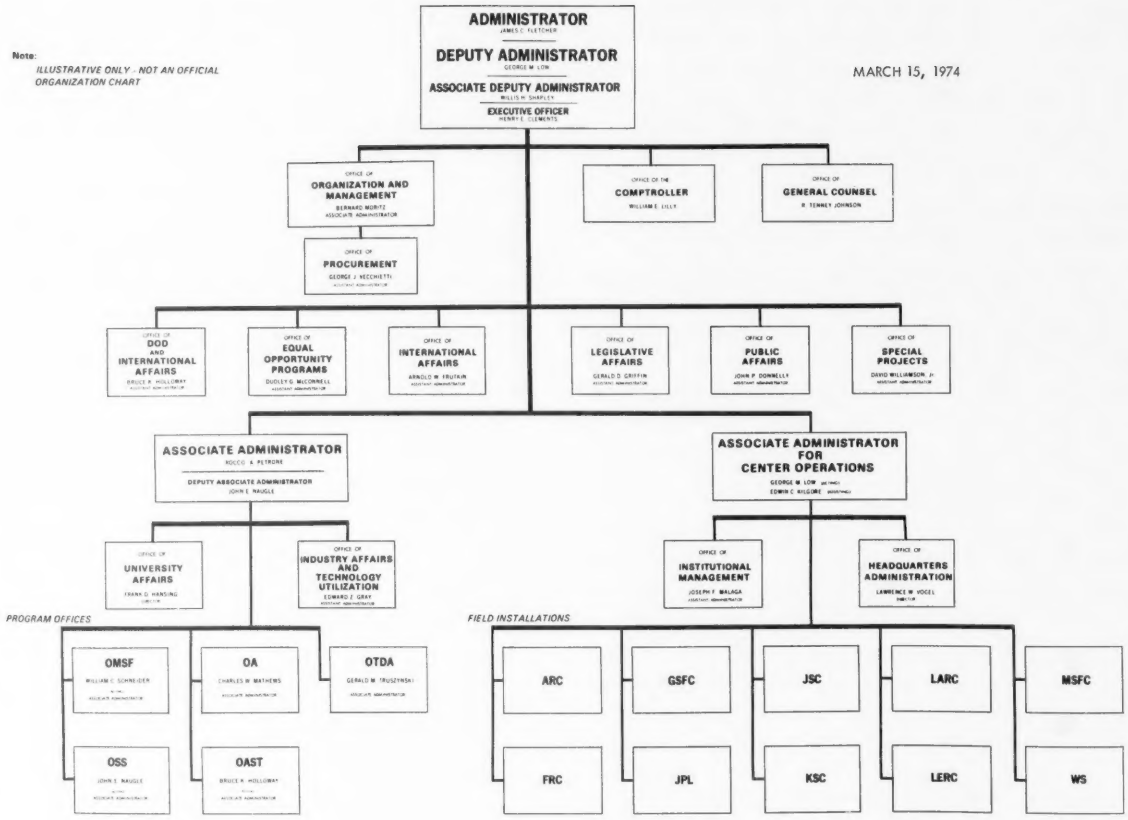
The value of the scientific information obtained at both Venus and Mercury is very high. The more we learn about other planets of the Solar System the more there is to marvel at, and the more we feel the call of destiny to travel there. And beyond this intellectual stimulation, of course, is the new understanding we are getting of Earth's environment, and what we must do to protect it and adapt to it as our original home planet, like the rest of the Solar System, continues through its evolutionary course.

We are now looking forward to the launch of our ATS-F satellite in early June and two Synchronous Meteorological Satellites in late May (or early June) and in July for further demonstration of how our rapidly advancing technology and maturing skills can be put to practical use for the benefit of mankind.

Sincerely,



JAMES C. FLETCHER
Administrator



FLETCHER INFORMS CONGRESS OF NASA'S REORGANIZATION

Says He and Other Officials Believe Changes Will Strengthen Management

Recent organizational changes at NASA Headquarters were described by Dr. James C. Fletcher, Administrator, during testimony before the House Committee on Science and Astronautics on March 21. The text of his statement follows:

I would like to summarize the organizational changes within NASA which went into effect March 15. We believe these changes will strengthen the organization and management of NASA.

NASA is going through a period of transition and consolidation. With the completion of the Skylab flights and with Space Shuttle development well under way, Dr. Low and I have recognized the need for a stronger mechanism for an orderly phaseover from conventional launch vehicles to the Shuttle and for innovative and coordinated approaches in planning and developing all our future payloads—manned and unmanned, science, applications, and technology. In addition, we have felt for some time the need for stronger central leadership of the NASA field centers which are NASA's most important resource and on which the success of all of NASA's activities depends.

We have therefore redefined the position of Associate Administrator of NASA to be the senior line official in charge of the planning and direction of NASA's research and development programs. He is now responsible to Dr. Low and me for direction of the activities of all the Headquarters Program Offices, including Manned Space Flight, Space Science, Applications, Aeronautics and Space Technology, and Tracking and Data Acquisition.

Dr. Rocco Petrone, who is with us here today, is the new Associate Administrator of NASA. For the past year, Dr. Petrone has been the Director of the Marshall Space Flight Center. Prior to that, he was Director of the Apollo Program at NASA Headquarters; before that he was, for

many years, Director of Launch Operations at the Kennedy Space Center.

Dr. John Naugle, who is well known to the Committee, has been named as Dr. Petrone's Deputy. Dr. Naugle became Associate Administrator for Space Sciences in October, 1967.

The other major change we have made is to strengthen our institutional management by establishing a new position of Associate Administrator of Center Operations as the senior line official in charge of the overall planning and direction of our field center operations. The Directors of the 10 major NASA field centers, who in recent years have reported to the associate administrators in charge of program offices, will now report directly to the Associate Administrator for Center Operations, who, in turn, will report to Dr. Low and me.

Dr. Low will serve as Acting Associate Administrator for Center Operations during an interim period until a full-time Associate Administrator for Center Operations is named.

PRESIDENT NIXON PRESENTS AWARDS TO SKYLAB 4 CREW

Makes Third Visit to JSC; Lauds Astronauts, Space Workers in Talk to Employees

President Nixon, making his third visit to Johnson Space Center in six years, was briefed while there on March 20 on both the Apollo-Soyuz Test Project and the Space Shuttle, the latter this nation's next venture in spacecraft.

He was greeted on arrival by Dr. James C. Fletcher, NASA Administrator, and Dr. Christopher C. Kraft, Jr., JSC Director.

The President's earlier visits were made in 1968, as a Presidential candidate, and in 1970, when he presented the medal of Freedom to the JSC Mission Operations Team for its role in bringing the Apollo 13 spacecraft safely back to Earth.

One of the purposes of his latest visit was to present NASA's highest award, the Distinguished Service Medal, to members of the Skylab 4 crew, Astronauts Gerald P. Carr, Edward G. Gibson and William R. Pogue.

While at the Center, he addressed JSC employees assembled outside the Exhibit Hall, where the presentations were made. Here are excerpts from his talk:

"* * * When man first landed on the Moon, of course it was an enormous event. And the second time and the third time. Even the first orbital flight, as we all recall—those names are legendary. But sometimes here in America we become accustomed to extraordinary feats, and sometimes we tend to take for granted bravery, intelligence, courage, all of those wonderful attributes that those men have displayed on this 84-day mission in space.

"But let me say while we sometimes take it for granted, that does not mean that we do not recognize not only their ability, but that we also recognize the contribution they are making to America and to science and to better relations between nations. * * *

Ground Crew Applauded

"Dr. Fletcher said about 120,000 people are working on the Skylab program and one the Soyuz program—120,000 people. Most of them aren't going to get medals. Most of them aren't going to be recognized as these three are being recognized, but every astronaut I have ever talked to says it is because of those men and women on the ground that we were able to do what we did in the air. I applaud those on the ground, all of you. We thank you for your service to make what they did possible. * * *

"Referring to the Cosmonauts, and the Americans, allow me to say something in the whole area of foreign policy which I think we in America need to understand, and that is why these joint projects with the Soviet Union are so important to America, to the Soviet Union, and to the whole cause of peace and progress in the world.

"Our systems of government are very different. Mr. Brezhnev and I have had some very interesting debates about the value of their system and the values of ours.

"But as far as our great objectives are concerned in many areas, they are the same. The Russian people want peace and we want peace. The Russian people want progress and we want progress. The Russian people want to cooperate with the United States and we want to cooperate with the Russian people and with all people on the Earth in everything that will advance the cause of science, the cause of health, the cause of a better life for all of our children, as well, of course, as the cause of peace.

"I do not mean that simply because we are going

ASTP BRIEFING—President Nixon, accompanied by Dr. James C. Fletcher, NASA Administrator, (on stairway) and others, is shown examining the Apollo-Soyuz Project command module during his recent visit to the Johnson Space Center.

to have this joint project with the Soviet Union in the field of space that the difference between our two systems will change, or that the differences that we have in various parts of the world where our interests lie will evaporate. Mr. Brezhnev as a realist knows that, and I as a realist know that as well.

Can Do Much Together

"But I do know that the Russian people are a great people, the American people are a great people, and we can do so much together, and when we work together, let's work together. That is what this program is all about.

"I remember when this whole space program began. You remember Sputnik, and when some in the Administration—at that particular time it happened to be an Administration of which I was a part—called it outer space basketball, and there was a tendency somewhat to think of it as a stunt, and there are many even in the United States today who raise the question, "Why go to the Moon? What is there—no people. Why have this orbital mission?"

"And let me put it in terms of what it means to America, to any great people. A great people must always explore the unknown. Once a great people gives up or bugs out, drops out, of competition of exploring the unknown, that people ceases to be great.

"Two centuries ago, three centuries ago, exploring the unknown meant Spanish and French and British sailors, and the rest, crossing the seas not knowing what they would find, looking for a new world, and now we know our world, and there are other worlds out there, far out. What are they? What is the unknown? We must go. We must go because, since it is there, failure to try to find what is there means that we have lost something that has been great in the American spirit from the time that we were a very small nation.

"You remember when we were just 13 colonies and how those pioneers went across the country. They were exploring the unknown. The other day, I remember, I was a little concerned that it took 10 minutes more than the three-hour schedule for our flight from Washington down here to Houston, and I think of my great-grandparents, or my grandparents, coming across the country by train, my great-grandparents, of course, and yours, perhaps, in covered wagons.

"We think, for example, how much has happened since then, and how much progress we have made. What I am saying, however, is this: You need not need to know that there is something there in order to have justification for trying to find out what is there. That is the mark of the scientist, but it is also the mark of a great people.

We Must Explore

"So, we must explore the unknown. That is why we are putting the money that we are into the space program; putting it in there because we realize that not only might we learn something, but also that we are going to do something for the American spirit, which is tremendously important, which allows me to pay a tribute to our astronauts and what they have done for that spirit.

"They have traveled America, and they have traveled the world and, believe me, they represent the best that is in America, these fine young men. * * *

"One of the byproducts—there are technological byproducts, there are scientific byproducts—but the greatest byproduct is this: What it does for our own spirit, that we as a great nation are moving forward in this area.

"And now finally a word with regard to cooperation with the Soviet Union. I am not going to get into some of the political problems and the other problems that are so difficult to solve that will be discussed again at the third summit, but cooperation with the Soviet Union in the field of space and in other areas that have received perhaps too little attention.

"Did you know that we have a new program, which we developed at the first summit in Moscow in 1972, for cooperation between American doctors and people from the medical profession in America with Soviet doctors and people from that profession in the Soviet Union?

Attack on Diseases

"Think what that might mean. I know all of you have heard of the new program that I announced two years ago for $100 million that we are going to spend in order to find, if we can, an answer to the problem of cancer, and maybe, the doctors tell me, it is many answers, not like polio where one vaccine is the answer, but many answers. * * *

"Now where is the answer? It may be in America. We have, I believe, the best medical profession in the world. But it might be in the Soviet Union, or it might be, for example, in Africa or Asia or Latin America. But wherever it is, that spark of genius that could find an answer, or one of the answers, to any one of the diseases that devastate mankind, we must go forward together to see that we allow it to develop.

"And we also know this: I was not a Boy Scout, and I see one here, but I remember they used to tell me about the Scouts that they had learned to rub sticks together, and when they rub them together they can create a spark, and so it might be that Soviet doctors working together with American doctors, rubbing together, may find that spark that each working separately might not ever find.

"And so I say to you, there are differences in the world in which we live. Thank God we are at peace for the first time in 12 years, all of our prisoners of war are at home. We are negotiating with the Soviets, with the People's Republic of China, two systems with which we have broad ideological differences, but wherever we can work together, whether it be exploration of space, or in cleaning up the environment, or in finding the answer to those diseases that plague mankind, let us have the statesmanship to see that we work together rather than separately, because all of mankind will benefit, not just America, and that is what we want. * * *

Concluding Remarks

"I will simply conclude my remarks by saying something with regard to my last visit to Houston, because it also tells us something about life.

"I was here when the Apollo 13 crew came back. They didn't make it, but they got back. And there were some who said they were failures. They didn't fail. The men and women on the ground didn't fail, because you are only a failure when you give up, and they didn't give up.

"And to me, those men with their courage, with their ingenuity, even though they didn't make it, they told us something about the spirit of America, a spirit that keeps us moving forward, as the greatest nation, we believe, in the world today, a spirit that tries always to be the very best but is never deterred by the fact that sometimes we may not succeed.

"And so today we applaud those who tried and did not make it. * * * And we pay respects to the great American scientific, mechanical and clerical communities that have made it possible for America to be first in space. You have contributed to a great technological breakthrough, but most important, when history is written in perspective 20 years from now, you have contributed to what is far more important: The spirit of a great country, which means always look out toward the unknown, go there, take any risk, make any sacrifice, and never be discouraged because sometimes you may fail. * * *"

NASA REPORTS TO SENATE GROUP ON ENERGY EFFORTS

Reviews Own R&D Projects, as Well as Cooperative Programs with Other Agencies

A 90-page report on energy-related research and development presently underway within NASA has been transmitted to the Senate Committee on Aeronautical and Space Sciences.

Entitled "Energy-Related Research and Development" and dated March, 1974, the report was prepared in response to a request from Senator Frank E. Moss, Committee Chairman.

In a memorandum to members of the Committee transmitting the report, Senator Moss stated:

"The imaginative and multi-faceted programs outlined in this report deserve careful review by all those concerned with energy conservation, production, and transmission. NASA's long experience in these fields for aeronautical and space science purposes is now being directly applied to pressing needs here on Earth. In my view, thoughtful study of this report squarely raises one question about our use of the NASA-industry-university team: Are we fully utilizing this priceless national resource to cope with critical problems like the energy crisis?"

The report has six main sections:

1. Introduction and Summary.
2. Projects in Energy Research and Development.
3. Remote Sensing Applied to Energy Resources.
4. Fuel Conservation in Aeronautics.
5. Relevant Space and Nuclear Research and Technology Programs.
6. Technology Utilization and Energy Research and Development.

The second section describes R&D projects which pertain directly to current and potential energy needs on Earth and are over and above NASA's regular space and aeronautics effort (whereas the programs described in Sections 3, 4, and 5 are a regular part of NASA's space and aeronautics effort).

R&D Funding for Projects

R&D funding for the projects listed in Section 2 is $11.2 million, including $6.1 million from NASA's budget and $5.2 million from other agencies. Two million dollars of the funding is from a special authorization from Congress for energy-related work.

Projects described in Section 2 are:

Solar-Electric Power Systems

Space-Based Solar Power Conversion and Power Relay Systems Study

Earth-Based Solar-Thermal Power Conversion and Delivery Systems Study

Solar Heating and Cooling

Residential Building Solar Heating and Cooling

Full-Scale Solar Collector Test Bed

Solar Heat and Cooling System Technology

Wind Electric Power Generation

TOURING FLIGHT RESEARCH CENTER—More than 450 members of the American Institute of Astronautics and Aeronautics from all over the West Coast recently toured Flight Research Center. After a briefing by Center Deputy Director Dave Scott, they walked through the main hangar where static displays and hardware were set up, with project people and pilots nearby to answer questions.

Energy Conversion, Transmission, and Storage
Potassium Rankine Topping Cycle Study
Energy Conversion Alternatives Study
Microwave Energy Transmission and Reception
Survey of Hydrogen Production Methods and of Its Potential for Replacing Fossil Fuels
Survey of High Energy-per-Acre Crops
Transportation Propulsion Systems
Hydrogen Injection for Automobiles
Automotive Gas Turbine
Aerodynamic Drag of Large Road Vehicles
Energy and Environment Conservation
Modular Integrated Utility Systems (MIUS)
Development and Evaluation of Gaseous Fuel Production by Pyrolysis of Municipal Waste
Remote Sensing of Smokestack Pollution
Air Pollution Source Identification

Section 3 discusses how remote sensing from space can help meet the current need to locate new energy sources and to properly develop existing ones. Data from the Earth Resources Technology Satellite (ERTS-1) and the Earth resources experiments on Skylab are being used to show how space sensors can help locate new sources of petroleum and geothermal energy.

Joint Research Planned

A joint research program with the U.S. Geological Survey is also being planned to use data from NASA's new Heat Capacity Mapping Mission and to develop more advanced remote sensing techniques for geothermal exploration. Research is also going forward on microwave detection of geothermal anomalies and on the enhancement of imagery by computers to aid prospectors for minerals and petroleum.

In Section 4 it is estimated that approximately $21 million of NASA's funding for aeronautical R&D in the current fiscal year is applicable to energy conservation. NASA's efforts to increase aircraft efficiency (and thereby conserve fuel) are discussed under the headings: Aeronautical Operating Systems, Aeronautical Propulsion, Aircraft Design, and Advanced Air Transportation Concepts. NASA's interest in hydrogen-fueled aircraft and in a new assessment of lighter-than-air vehicles is indicated.

The introduction to Section 5 of the report explains:

"Under its charter to enhance capabilities for the exploration and utilization of space, NASA conducts a wide range of activities in the physical sciences concerned with sources of energy and its conversion, storage, and transmission. While the motivation for these programs is found in space missions, and they are funded by the Space and Nuclear R&D budget, their very nature makes them have relevancy to energy R&D for Earth-based systems. In most cases, however, the applications for these technologies on Earth may not occur for several decades."

Programs described in Section 5 are:

Energy Conversion, Transmission, and Storage
Solar Cells and Arrays
Chemical Energy Conversion and Storage
Power Processing
Thermomechanical Energy Conversion
Thermionic Energy Conversion
Magnetohydrodynamic Power Generation
High Power Laser Systems
New Horizons in Propulsion
Nuclear Energy
High Temperature Plasma (Fusion Research)
Uranium Plasma (Gas Core) Reactor Research

Commenting on the High-Temperature Plasma Research effort, the report states:

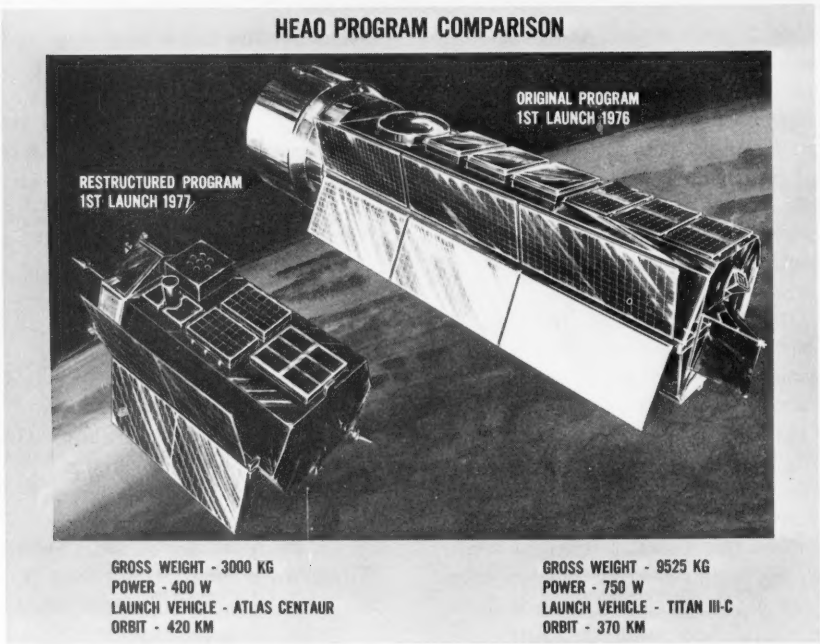
"In the long term, fusion energy sources appear to offer the ultimate in performance potential for space missions extending great distances into space. The prospects in this case are a propulsion system . . . which will allow spacecraft to voyage throughout the solar system with moderate trip times. In addition, the NASA research on high-temperature plasmas will aid in the achievement of fusion power on Earth."

NASA's work on the research described in Section 5 is budgeted at about $12.5 million for the current fiscal year.

In Section 6, three Technology Utilization projects which relate directly to energy conservation are described. They are the use of ferro-fluid separators to separate nonferrous metals from scrap collections; field tests of nickel-zinc batteries; and development of a risk management and facilities certification methodology for liquid natural gas facilities.

(For sale by the U.S. Government Printing Office, Washington, DC 20402. Price: $1 per copy.)

Skylab 4 Astronauts Gerald P. Carr, Edward G. Gibson and William R. Pogue will return to KSC April 26 for a reunion with the NASA launch organization. They will be guests of the Center management at a luncheon, after which they will meet with the launch team in the Vehicle Assembly Building and be introduced by Dr. Kurt Debus, Director.



DR. NAUGLE TELLS CONGRESS HEAO PROGRAM TO BE RENEWED

Describes Program Aimed at Learning Secrets of Cosmic Energy

HEAO, the High Energy Astronomy Observatories program first recommended by the President's Scientific Advisory Committee as early as 1967, but suspended by NASA in January, 1973, because of severe budget constraints, is to be renewed.

This was brought out in testimony in connection with NASA's new budget requests by Dr. John E. Naugle, Associate Administrator for Space Science, before the House Subcommittee on Space Science and Applications. It was part of his discussion of the physics and astronomy, planetary exploration, and lunar programs described by him as providing for "an orderly transition from the early phases of space exploration to the Shuttle era."

One reason for reviving HEAO is the energy crisis.

"In HEAO we will take another step toward unlocking the portals that guard the secrets of cosmic energy," Dr. Naugle said.

He added that the program meets the scientific challenge posed by recent discoveries.

"For the first time," he continued, "we will use major instruments in investigating cosmic X-ray emissions, the radiation that appears to carry most of the energy in the universe. This work will unquestionably have far-reaching consequences."

Energy Paces Mankind

He recalled that the history and development of mankind have been paced by man's ability to unlock and use energy stored by nature. Fire was the basis of early civilization; chemical energy stored in fossil fuels is the basis of today's.

"Before these resources waned to a critical level," Dr. Naugle said, "we discovered the process by which nuclear energy powers the stars and are now well on the way toward using nuclear energy here on Earth."

Nuclear power, studied as a solar energy source during the 1930s, he reminded, is already beginning to feed the nation's transmission lines.

"The plasma processes in the solar atmosphere create solar flares," he continued. "Can we use plasma furnaces here on Earth for the same purpose? Will knowledge about cosmic energy generation in quasars find practical application on Earth? The proposed research will permit great steps toward our ability to answer these questions."

At an early date, HEAO was given the highest priority both by recommendations of the President's Advisory Committee and by NASA officials.

On Oct. 22, 1970, in a talk at Houston, TX, Dr. George M. Low, Deputy Administrator, told AIAA members that "the principal new feature of our space programs during the 1970s will be the development of a new HEAO to obtain high quality data on X-ray, gamma-ray, and cosmic-ray sources in space."

The decision to proceed with the HEAO program, Dr. Naugle told the Subcommittee, was based on confirmation by the scientific community that it continues to be the highest priority program in space astronomy. The violent processes that liberate untold amounts of energy in the universe, he explained, can be studied adequately only with the advanced instruments carried on large spacecraft such as HEAO. Moreover, great discoveries in high energy astrophysics have demonstrated the urgent need for the capability of a HEAO.

HEAO Scaled Down

Since budget constraints became effective, NASA has scaled down the size of HEAO. Information developed since the original definition of the spacecraft has been used to develop the most timely experiments. These, Dr. Naugle said, can be carried out with the following three spacecraft, each weighing only a third of what the original design weighs:

HEAO-A, designed to conduct a sky survey for X-ray sources with a radiation level only one-millionth as intense as the brightest source in the sky.

HEAO-B, designed to carry an X-ray telescope to study, in detail, complex X-ray-emitting regions in the sky.

HEAO-C, designed to carry cosmic-ray and low-energy gamma-ray instruments to look for nuclear gamma-ray lines believed to be emitted by radioactive elements produced during a supernova explosion.

"Questions about energy, how to conserve and generate it, are uppermost in our minds today," he reminded in his concluding remarks.

The program proposed, he said, is broadly based, but is restricted to limited, high-priority objectives that were carefully selected from almost unlimited opportunities. He added that it lays the foundation for "the more efficient use of our talents to conduct space research at much lower cost for a given amount of scientific information, and it will permit the best minds of the world to work on the problems of such great interest to us."

AFTER TRYING THE F-104—Dr. George M. Low (right), Deputy NASA Administrator, a recent visitor at the Flight Research Center, is shown after his return from a flight in the F-104 at the rear. With him is John Manke, who piloted the plane and demonstrated Shuttle approach techniques.

ROCK OLD AS MOON

Atomic age dating methods have indicated a fragment of rock brought back by the Apollo 17 crew in December, 1972, to be 4.6 billion years old, generally believed to be the age of the solar system.

This announcement was made at the opening session of the fifth annual Lunar Science Conference held at Johnson Space Center during March and attended by 500 scientists from all over the world.

The rock fragment was found among 200 pounds of lunar material collected by Astronauts Harrison Schmitt and Eugene Cernan during their stay on the Moon. It contains a greenish mineral known as dunite, which had been ripped from deep within the Moon by the collision of a large meteor and deposited on the surface. There it lay billions of years until picked up by the Apollo 17 crewmen.

Rocks returned by earlier missions were found to be only about four billion years old.

Dr. Robert Walker of Washington University in St. Louis noted at the convention that the dunite sample and the information it supplied would not have been available had the Apollo program stopped with Apollo 15, as some space officials had suggested as a result of space budget cuts.

INSPECTING MTF ACTIVITIES—A tour of the installation was part of the program arranged for a meeting of the Applications Program Integration Board held at the Mississippi Test Facility during March. In this photograph, Charles W. Mathews (third from left), Associate Administrator for Applications, is shown with others who attended on the tow tank of the Department of Interior's indoor Hydroscience Center.

SPACE APPLICATIONS BOARD HOLDS DISCUSSIONS AT MTF

Reviews Programs Considered of Possible Aid to National Problems

A two-day meeting of the Applications Program Integration Board was held at the Mississippi Test Facility during March for a study of present and future NASA programs to ensure efficient application of space knowledge to national problems.

Charles W. Mathews, Associate Administrator for Applications, who opened the sessions with a review of the FY 1975 budget, explained that MTF was selected as a site for the meeting because of the "somewhat unique collection of applications activities" conducted there by NASA and other federal and state agencies.

Discussions centered around activities and programs which may provide social and economic benefits to the "user" community. Topics included Earth observations, communications, navigation and traffic control, space processing and technology, geodesy and applied Earth physics, and energy distribution.

A tour of the NASA laboratories and of the activities of other agencies under way there was a part of the program.

Jackson M. Balch, MTF Director, said he was pleased at the meeting site selection because it would give Headquarters and installation officials who attended an opportunity to see first hand the productive working relationships developed there between NASA and other agencies.

"We are looking for people-aiding uses of what we in NASA have and what we are learning in conjunction with other federal and state agencies," he added.

NASA TO GET ASPI AWARD

NASA has been selected by the American Society for Performance Improvement to receive its award to government for the most significant contribution to excellence for management and direction of the Manned Space Program.

ASPI, formerly known as the American Society for Zero Defects, is represented by many of NASA's prime contractors and has worked closely with the NASA Aerospace Awareness Council. It has functioned as a forum for exchanging ideas and concepts relative to performance improvement programs and employee motivation.

The award to NASA will be made at a banquet to be held at San Mateo, CA, April 25.

SHEPARD TO RETIRE

Rear Admiral Alan B. Shepard, Jr., who in a suborbital flight in Freedom 7 on May 5, 1961, became the nation's first man in space, has announced plans to retire from NASA in June.

Alan B. Shepard, Jr.

He is expected to be succeeded as Chief of the Astronaut Office at Johnson Space Center by Astronaut John W. Young, a member of the Apollo 10 and Apollo 16 crews.

Shepard was one of the first seven astronauts. Two years after his flight into space, he was grounded with an inner-ear ailment that threatened to wreck his space career. But in 1969, after a successful operation, he was restored to flight status and flew in 1971 as Commander of the Apollo 14 crew. It was while on this mission that he introduced sports to the Moon by hitting a golf ball on the lunar surface, an action seen by millions of television viewers.

That same year he was promoted to rear admiral, the first astronaut to achieve such high military rank. Several months later, he was appointed to a term as U.S. Delegate to the United Nations.

HYDROGEN ENERGY BIBLIOGRAPHY

A hydrogen energy bibliography, with abstracts, believed to be the most comprehensive ever compiled, has been published by the Energy Information Center at the University of New Mexico at Albuquerque.

The Center was recently established as a cooperative effort by the University's College of Engineering and the NASA-sponsored Technology Application Center there. Its purpose is to serve as a focal point for the dissemination of information on the broad field of energy.

The bibliography, entitled *Hydrogen Energy* and priced at $25 per copy, is the Center's first publication. Covering the period from 1953 to 1973, it contains more than 900 references. Supplements will be published annually. A special quarterly update service is available for $50 additional.

WEATHER ROCKETS LAUNCHED

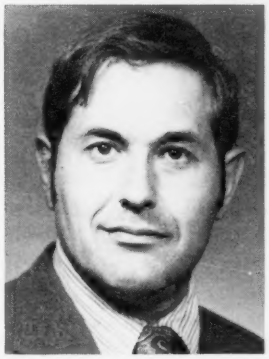
A record series of 79 rocket launches from eight sites in the Western Hemisphere have been completed as part of a program to determine daily variation in temperature and wind conditions in the upper atmosphere at the time of the spring equinox.

The launches made at regular intervals over a 24-hour period beginning at 12:05 p.m. Eastern Daylight Time on March 19 were from locations in North, Central and South America, the Caribbean Sea, and the Atlantic Ocean.

Single-stage Loki and Super Loki rockets carried meteorological instruments to heights of about 70 kilometers (40 miles). The payloads were ejected and returned to Earth by parachutes.

As the instruments descended, atmospheric temperature readings were telemetered to ground receiving stations. At the same time, radar tracked the parachutes to reveal wind conditions in the upper atmosphere.

The series of launches is expected to bring scientists a better understanding of upper atmospheric circulation and temperature patterns, and should yield benefits in improved weather forecasting.



Demetrius A. Kourtides

George P. Koo

NASA MAN CITED—PLASTICS ENGINEERING magazine, official publication of the Society of Plastics Engineers, has cited Demetrius A. Kourtides, Technical Assistant to the Chief, NASA's Chemicals Research Project Office, Moffett Field, CA, along with Dr. George P. Koo of the Standard Research Institute, Menlo Park, CA, for their voluntary contributions in helping plan the Annual Technical Conference (ANTEC) of the Society. More than 2,000 engineers and scientists from all parts of the world are expected to attend the meeting, scheduled to be held in San Francisco May 13-16.

NASA SALUTED—As a tribute to NASA, the Eastman Kodak Company recently gave a special program in Washington attended by members of Congress and others. One of the highlights of the evening was a slide talk on the history of photography in the space program by Astronaut Russell L. Schweickert. In this photo, Dr. George M. Low (left), Deputy Administrator, is shown accepting on the part of NASA a symbolic piece of sculpture from Walter A. Fallon, president of Eastman. It is inscribed to NASA "for notable advances through the recorded image in enlarging man's understanding of himself and his world."

SHUTTLE OFFICE CHANGES

Robert E. Lindstrom has been promoted from Deputy Manager to Manager of the Shuttle Projects at Marshall Space Flight Center. He replaces Roy E. Godfrey, who has been named special assistant to the MSFC Director and who will continue to oversee the Source Evaluation Board activities related to the award of a contract for the development of the Shuttle solid rocket motor.

In another change, James R. Thompson, formerly chief of Man/Systems Integration in the Astronauts Laboratory, has been designated Project Manager of the Space Shuttle Main Engine (SSME), replacing William D. Brown, who has been named technical assistant to the Acting Director of the Systems-Products Office.

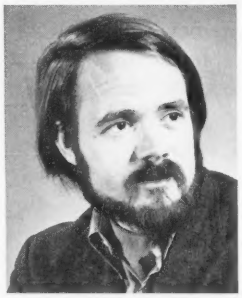
John A. Chambers, formerly of the Skylab Office, has been made Deputy Manager of the Shuttle Engine Office, and Frank M. Stewart of the SSME Project Office is now technical assistant to the Manager of the Shuttle Projects Office.

NEW NASA PUBLICATION

APOLLO 17 PRELIMINARY SCIENCE REPORT is a comprehensive account of the sixth and last of the Apollo series of manned lunar landings. It was prepared by the Johnson Space Center and is profusely illustrated. In the foreword, Administrator James C. Fletcher observes that "it may be that, from the perspective of decades, the Apollo program will stand out as the most singular achievement to date in the history of man's scientific and engineering endeavor." Paperbound copies of this 704-page report are available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, for $7.95 each. (SP-330)

DENNIS WILLIAMS TRANSFERRED

F. Dennis Williams, Public Information Specialist in the Office of Public Affairs at Johnson Space Center, has been transferred to Headquarters and appointed Public Information Officer for International Affairs, succeeding Richard Friedman, who is retiring from NASA.



Dennis Williams

A native of Madison, WI, Williams received a B.A. degree in English from the University of Wisconsin in 1965 and completed the course work and examinations for his Ph. D. in English at Rice University in 1967. For three years, he taught courses in English and communications at Carnegie-Mellon University, writing part-time for the *Pittsburgh Point.*

In 1972, he completed his Master's degree in Journalism at the University of Iowa and also course work and examinations for a Ph.D. in Mass Communications. He worked as correspondent for the *Davenport Times-Democrat* and as writer and copy editor for the *Daily Iowan.*

He joined NASA Headquarters as a management intern in August, 1972, with assignments in public information, resource analysis, and congressional liaison. The following April, he was transferred to Johnson Space Center as Public Information Specialist for Earth resources, science, and applications. During the Skylab program, he worked as Mission Control commentator, conducted press conferences, prepared news releases, and answered questions from the press and general public. He also edited the special dedication issue of the JSC *Roundup.*

FRC ENGINEER GETS AWARD—John W. Edwards, aerospace engineer at Flight Research Center, was recently presented the 1974 Hugh L. Dryden Memorial Fellowship. He is shown making his acceptance remarks at the National Press Club in Washington, where the presentation took place. The award, named for the late Deputy Administrator of NASA, is designed to provide employees of proven ability and outstanding potential the opportunity of undertaking concentrated study of long-range technical problems.

JSC ADDS ATTRACTIONS

The Johnson Space Center, visited each year by an average of a million persons, has added several new attractions to its Visitor Orientation Center.

They include "America," the spacecraft that carried the final Apollo crew to the Moon; the Lunar Landing Training Vehicle, one of only two left in the world; the Apollo Lunar Surface Experiment Package receiving station, still getting live signals from the Moon; and the LTA-8, identical to the LM used to land the first men on the Moon.

The Center is open to visitors for self-guided walking tours seven days a week from 9 a.m. to 4 p.m., except on Christmas Day. Guided tours are available Monday through Friday at 9:15 a.m,. 11 a.m., 1 p.m. and 2:30 p.m.

JSC also sponsors a special space-science program for elementary, junior and senior high school groups.

HEADQUARTERS PRESS RELEASES

74–52 X–24B First Supersonic Flight Set
74–53 UK–X4 Launch Rescheduled
74–54 Mariner 10 Set for Close Approach to Mercury (Press Kit)
74–55 Pioneer 11 Emerges from Asteroid Belt
74–56 NASA Announces Reorganization of Top Level Level Posts
74–57 Re-Fanned Jet Engine Successfully Tested
74–58 Monaco Lauds NASA TV Contributions
74–59 Pilots Escape Injury in Helicopter Crash
74–60 NASA Remote Sensing to Assist in Eradicating Screwworm
74–61 Note to Editors (Venus Briefing)
74–62 Mercury Probe Will Produce 2000 Planet Photos
74–63 NASA to Participate in Testing Wind Generator
74–64 Patient Monitor Developed from NASA technology
74–65 Unique Fastener Developed from Space Technology
74–66 Space Shuttle Runway Contract Goes to Morrison Knudsen
74–67 Jacksonville Firm Awarded Shuttle Contract
74–68 Pioneer 11 to Be Retargeted for Saturn
74–69 Hydrogen Energy Bibliography Published
74–70 ATS–F Launch Rescheduled
74–71 79 Rocket Launches Test Weather Variations
74–72 Processing Vaccines in Space
74–73 Morris Named to Management Post in Office of Applications

RADIO-TELEVISION (Released Nationally)

April

TELEVISION—A color film release, *Aeronautics and Space Report*, "Airplane Crashworthiness Tests (Langley)" and "IMBLMS—Medical Services for Remote Areas."

RADIO—Five weekly *Space Story* programs are to be released: "Space Research Spinoff," (ARC/Dr. Williams); "Edwards Shuttle Testing," (FRC/Scherer); "Skylab Completion," (Hdqrs/Schneider); "Pioneer 11 to Jupiter, Saturn," (ARC/Hall); and "Viking-Mars Life Search," (ARC/Dr. Klein). Two *NASA Special Reports* will be released: "Skylab Crew Report" (featuring Skylab 4 astronauts) and "Skylab Review," (Hdqrs/Schneider).

LUNAR SAMPLE EXHIBITS

The following is a schedule of lunar sample exhibits from April 15 to May 15:

IOWA—Total Impact Program, Des Moines, April 22-May 10.

INDIANA—NASA Aerospace Educational Community Involvement Program, Indianapolis, April 22-May 3.

NEW JERSEY—Earth Week 1974, Moorestown Mall, Willingboro, April 22-27.

NEW YORK—Batavia Jaycees Annual Better Home Show, May 3-5.

OHIO—Cleveland Astronomical Society Annual Dinner Meeting, Warner-Swasey Observatory, Taylor Road, East Cleveland, May 10.

OKLAHOMA—Annual Open House, Vance Air Force Base, April 27.

SOUTH DAKOTA—Yankton High School Science Week, Yankton School, Yankton, May 13-18.

TENNESSEE—AFL-CIO Union Industries Trade Show, Memphis, April 26-May 1.

Permanent Displays

ALABAMA—Alabama Space & Rocket Museum, Marshall Space Flight Center, Huntsville.

FLORIDA—Visitor Information Center, Kennedy Space Center.

KANSAS—Eisenhower Library, 200 S. E. 4th Street, Abilene.

NEW YORK—United Nations Building, New York.

OHIO—U.A.F. Museum, Wright Patterson Air Force Base.

TEXAS—Johnson Library, University of Texas, Austin; Visitor Information Center, Johnson Space Center, Houston.

VIRGINIA—Visitor Information Center, Langley Research Center, Hampton.

WASHINGTON, DC—National Geographic Museum; Smithsonian Institution, National Air and Space Museum, 1000 Jefferson Drive.

INVENTIONS AND CONTRIBUTIONS BOARD MONETARY AWARDS

(The Inventions and Contributions Board, at its meetings of Oct. 30, Nov. 20 and Dec. 18, 1973, recommended that monetary awards be granted to the NASA employees and the NASA contractor employees identified on the following list for scientific and technical contributions to space and aeronautical activities. The recommendations were approved by the Administrator and the awards have been made.)

Innovator(s)	*Title of Invention or Contribution*
AMES RESEARCH CENTER	
John M. Pope Thomas B. Fryer	Miniature Ingestible Telemeter Devices to measure Deep-Body Temperatures
GODDARD SPACE FLIGHT CENTER	
Edward L. Sanford	Automatic Restart/Automatic Stop Circuit (AR/AS)
JOHN F. KENNEDY SPACE CENTER	
Frank S. Howard	Floating Baffle to Improve Efficiency of Liquid Transfer from Tanks
LANGLEY RESEARCH CENTER	
Frederick W. Gibson	A Pressure Operated Electrical Switch
Blake W. Corson	Cascade Plug Nozzle
Jag J. Singh	Mossbauer Spectrometer Radiation Detector
JOHNSON SPACE CENTER	
Norman Belasco Sam L. Pool	Medical Subject Monitoring System
MARSHALL SPACE FLIGHT CENTER	
John L. Burch	Automatically Operable Self-Leveling Load Table
WALLOPS STATION	
William G. Lewers	Emergency Master Control Valve
APPLIED PHYSICS LAB., JOHNS HOPKINS	
Carrol T. Pardoe Alvar Carlton Robert Appel	Data Blocking Multiplexing System
THE BOEING CO.	
Donal W. Mangold	Medical Subject Monitoring System
FAIRCHILD HILLER	
Robert J. Eby Edward Powers	A Thermal Control System for a Spacecraft Modular Housing
JET PROPULSION LABORATORY	
Dan A. Bathker Arthur C. Ludwig Samuel A. Brunstein	Dual Frequency Microwave Reflex Feed
Lien C. Yang	Compact Pulsed Laser Having Improved Heat Conductance
Vilhelm M. Johnsen Charles F. Campen, Jr.	A Sampler Processor and Method for the Automatic Extraction of Families of Compounds

INVENTIONS AND CONTRIBUTIONS BOARD MONETARY AWARDS—Cont.

Innovator(s)	*Title of Invention or Contribution*
LOCKHEED MISSILES & SPACE CO.	
Howard L. Peterson Donald K. Kinell	Complementary MOS Four-Phase Logic Circuits
Garry J. Cleveland George M. Loh Robert S. Luce M. I. Lipanovich Howard L. Peterson	Medical Subject Monitoring System
MARTIN MARIETTA CORP.	
Victor A. Des Camp Michael W. Hussey Michael W. Boex Thomas P. Larson	Filter Regeneration System
McDONNELL DOUBLAS CORP.	
Joseph P. Valinsky	A Device for Monitoring a Change in Mass
MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
William M. Daly John F. McKenna, Jr.	Fault Tolerant Clock Apparatus
NATIONAL ACADEMY OF SCIENCE	
Michael J. Goodyer	Stagnation Pressure Probe
NORMAN ENGINEERING	
Edward Slattery	High Temperature Hot Water Vacuum System
STANFORD RESEARCH INSTITUTE	
Stanley Roy Morrison Thomas Freund	Stabilization of Pigments
UNIVERSITY OF WISCONSIN	
William Kraushaer	Coaxial Anode Wire for Gas Radiation
WESTINGHOUSE ELECTRIC CO.	
Joe B. Hammer	Arc Heater Apparatus and Method for Producing a Diffused Arc Discharge

PATENTS AND INVENTIONS RESULTING FROM NASA RESEARCH

(The Office of General Counsel, NASA Headquarters, announces that the following U.S. patents have been issued by the U.S. Patent Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel for the indicated installation.)

Inventor(s) and Employer	*Title of Invention*	*Patent No.*	*Installation*
Harry O. Fuller, NASA/LaRC	Reefing System	3,796,473	LaRC
Leo G. Monford, Jr., NANA/JSC	Multifunction Audio Digitizer	3,795,900	JSC
Robert F. Roller, Westinghouse Electric Corp., Pittsburgh, PA.	Demodulator for Carrier Transducers	3,795,862	LeRC
Fred F. Eichenbrenner and Leland A. Imig, NASA/LaRC.	Anti-Buckling Fatigue Test Assembly	3,795,448	LaRC
Sol Aisennerg, Space Sciences, Inc.	Dopplet Shift System	3,795,448	Hdqrs.
Albert P. Wagner, Theodore J. Ebersole and Robert E. Andrews, General Electric Co., Philadelphia, PA.	Invertor Ratio Failure Detector	3,795,858	NaPO
Laurence J. Bement, NASA/LaRC	Totally Confined Explosive Welding	3,797,098	LaRC
Wade O. Smith and Albert R. Toft, NASA/GSFC.	Formation of Star Tracking Reticles	3,799,793	GSFC

PATENTS AND INVENTIONS RESULTING FROM NASA RESEARCH—Cont.

Vitaly Danchenko, NASA/GSFC	Radiation Hardening of MOS Devices by Boron	3,799,813	GSFC
Ronald A. Cohen and Roy K. Wheeler, NASA/ERC.	Method and Apparatus for Stable Silicon Dioxide Layers on Silicon Grown in Silicon Nitride Ambient.	3,796,592	JSC
William J. Robinson, Jr., NASA/MSFC	Microwave Power Transmission System Wherein Level of Transmitted Power Is Controlled by Reflectors from Receiver.	3,795,910	MSFC
Joseph M. Cambra, NASA/ARC	Overvoltage Protection Network	3,795,840	ARC
P. A. Christopher, W. J. Gross, W. H. Henley and B. D. Swirsky, McDonnel Douglas Corp.	Method of Fabricating an Object with a Thin Wall Having a Precisely Shaped Slit.	3,798,741	LaRC
George M. Dudley, NASA/LaRC	Metered Coolant Valve	3,798,726	LaRC
Edgard B. Pritchard, NASA/LaRC	Orbital and Entry Tracking Accessory for Globes	3,798,778	LaRC
Wayne H. Bryant, NASA/LaRC	Digital Controller for a Baum Folding Machine	3,800,253	LaRC
Kenneth H. Holko, NASA/LeRC	Diffusion Welding	3,798,748	LeRC
John A. Rummel and Cortes L.	Metabolic Analyzer	3,799,149	MSFC
Viggo G. Dereng, NASA/LaRC	Parachute Deployment Bag	3,799,480	LaRC
Robert B. Nakich and Raymond C. Woodbury, Caltech/JPL.	Apparatus for Scanning the Surface of a Cylindrical Body.	3,800,074	NaPO
Martial A. Honnell, Auburn University, Auburn, AL.	Automatic Frequency Control for F. M. Transmitter	3,800,224	MSFC
Herbert S. Kobayshi, NASA/JSC	Pulse Code Modulated Signal Synchronizer	3,800,227	JSC
Raymond C. Woodbury, Caltech/JPL	Gated Compressor, Distortionless Signal Limiter	3,800,237	NaPO
James O. McClenahan, NASA/ARC	High-Speed Shutter	3,797,919	ARC

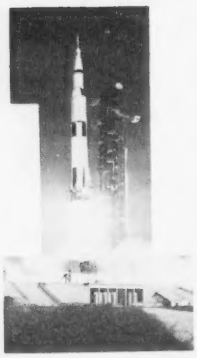
1974 LAUNCH SCHEDULE

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*	
Skynet II–A (UK)	Jan. 18	Delta	ETR	Reimbursable launch. United Kingdom's communications satellite.	Launched Vehicle failure
Centaur Proof Flight	Feb. 11	Titan III–E Centaur	ETR	Test flight of booster planned for Viking Mars launch in 1975.	Launched Engine failure
San Marco (SM–C2)	Feb. 18	Scout	SM	United States/Italy cooperative mission to conduct air density measurements.	Launched
UK X–4	Mar. 8	Scout	WTR	Reimbursable launch. United Kingdom technology satellite with experiments related to spacecraft power systems, attitude control and stabilization.	Launched Successful
WESTAR–A	April 11	Delta	ETR	Western Union communications satellite. Reimbursable launch.	
Hawkeye (formerly Injun-F)	May 23	Scout	WTR	To study the topology of the magnetic field at large radial distance over the Earth's dgear caps and the interaction of the solar winds with the geomagnetic field.	
SMS–A	May 30	Delta	ETR	First prototype/developmental mission for geostationary meteorological operational satellite system; day and night continuous imaging of cloud cover; sophisticated remote-platform data-collection-and-weather data relay.	
ATS–F	June 2	Titan III–C	ETR	Developmental and demonstrative communications mission using technology applicable to terrestrial and space needs; utilizes 9.15-meter (30-foot) deployable parabolic antenna and communications system with frequencies in several bands; will support public communications experiments in the U.S. and India.	

1974 LAUNCH SCHEDULE—Cont.

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*
Intelsat IV F–8 ..	June	A–Centaur ..	ETR	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.
Nimbus F	June	Delta	WTR	Meteorological research and development mission to test instruments for expanding atmospheric remote sensing to cloud regions, extend observations to new spectral regions, extend sounding capabilities to higher altitudes, demonstrate feasibility for improvements to operational systems, and support GATE.
WESTAR–B	June	Delta	ETR	Western Union communications satellite. Reimbursable launch.
SMS–B	July	Delta	ETR	Second prototype/developmental mission for geostationary meteorological operational satellite system; same as SMS–A; SMS–A and SMS–B will support GARP Atlantic Tropical Experiment (GATE).
ITOS–G	July	Delta	WTR	Polar-orbiting operational meteorological satellite funded by NOAA; day and night cloud cover and temperature sounding.
AEROS–B (German)	July	Scout	WTR	Spin-stabilized, Earth-orbiting satellite designed for upper atmosphere measurements.
Netherlands Sat.–A (ANS–A)	August ..	Scout	WTR	Designed to obtain data from celestial X-ray and ultraviolet sources.
GOES–A (SMS–C)	August ..	Delta	ETR	First Geostationary Operational Environmental Satellite, follow-on to SMS missions, funded by NOAA.
UK–5	August ..	.....	.....	To investigate galactic and extra galactic X-ray sources.
Helios–A	2nd Half	Titan III	ETR	To investigate the properties of and processes in interplanetary space in the direction of and close to the Sun by developing, launching and operating automated spacecraft.
Intelsat IV F–6 ..	3rd Qtr. ..	.....	.....	One of a series of communications satellites to form part of a global communications commercial satellite system. Launch for COMSAT.
Skynet II–B (UK)	3rd Qtr. ..	Delta	ETR	Reimbursable launch. United Kingdom communications satellite.
WESTAR–C	October ..	Delta	ETR	Western Union communications satellite. Reimbursable launch.
Comsat–A	4th Qtr. ..	Delta	ETR	First of two maritime communications satellites to be situated over Atlantic and Pacific Oceans.
Symphonie–A (French/German)	4th Qtr. ..	Delta	ETR	Experimental communications satellite. Reimbursable.
Intelsat IV F–1 ..	4th Qtr. ..	.....	.....	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.
GEOS–C	(Under Study)	Delta	WTR	Geodynamic Experimental Ocean Satellite to demonstrate feasibility of satellite-altimeter techniques for measuring the topography of the ocean surface; can be significant contribution to understanding of ocean dynamics.

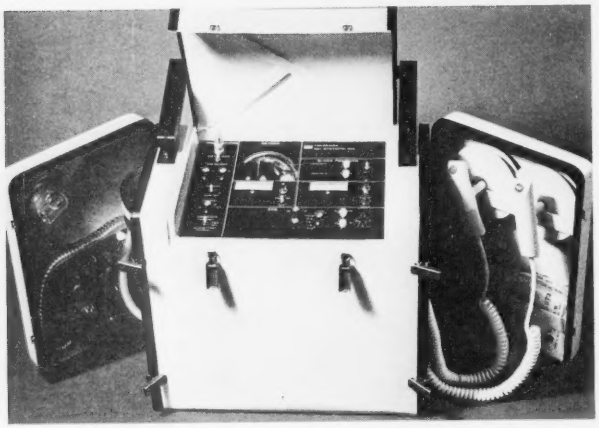
ARE YOU GETTING YOUR

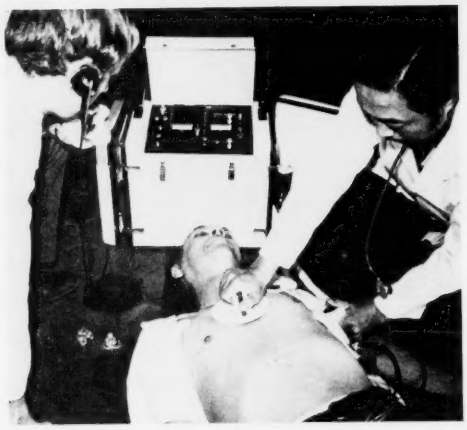


WORTH FROM SPACE?

FOR A PENNY OF YOUR TAX DOLLAR, YOU ARE GETTING ...

EMERGENCY MEDICAL SYSTEM





In almost any emergency, the first few minutes after it happens are the most critical. If a physician is on hand, crippling or fatal results are lessened. But if no doctor is present, the next best thing is to have one supervise at a distance, advising and giving directions. Accurate diagnosis and therapy can be highly instrumental in saving a patient's life, especially in cases involving heart attacks, shock, or drowning.

This is the sort of demand that NASA space technology has helped meet. The answer is a compact, 18-kilogram (40-pound) medical unit, called Telecare, that fits into an ambulance and permits trained emergency medical technicians to administer prompt, professional care under radio direction of a physician who may be miles away in his office or even in a hospital emergency room.

The overall concept of the system brings together six major elements: trained personnel, diagnostic and therapeutic equipment for use in the field, communications, vehicles, physicians, and hospital facilities.

Despite its suitcase size, Telecare contains the following equipment:

A respiratory resuscitation system; a 15-minute oxygen supply contained in a light-weight canister developed from space technology; an electrocardiogram display and telemetry system; a defibrillator for external heart stimulation; a semi-automatic indirect blood pressure measurement system using a special microphone placed beneath a hand-inflated cuff, similar to the blood pressure device used in the Skylab program; and a basic pharmaceutical pack.

The process was developed by SCI Systems, Inc., of Houston, TX. Quickly taking advantage of it, the City of Houston equipped 28 rescue vehicles with Telecare units and trained technicians in their operation. Other cities throughout the nation are currently evaluating the system for possible incorporation in their emergency medical services programs.

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

"FOR THE BENEFIT OF ALL MANKIND."

AMERICAN REVOLUTION BICENTENNIAL 1776-1976